A STUDY OF THE RING-BILLED GULL IN ALBERTA

BY J. A. MUNRO

The existence of a large gull colony on Goose Island in Bittern Lake, Alberta, was discovered in 1927 by Mr. Frank L. Farley, who, in the years following, banded approximately a thousand nestlings each year. This author states (Birds of the Battle River Region of Central Alberta, The Institute of Applied Art, Ltd., Edmonton, Alberta, 1932), "When this colony was discovered in 1927, California Gulls appeared to greatly out-number the ringbills. In 1931 it looked as though there had been an entire reversal of status, and the opinion was freely expressed by banding operators that the ringbills were then in the majority."

Different conditions prevailed in 1932, when I first visited the island in company with Mr. Farley, and during the two years following. In those years the population, which remained fairly constant at 1400 to 1600 adults, estimated, was composed almost entirely of Ring-billed Gulls (*Larus delawarensis*). More precisely in 1932 I identified positively only five, and in 1933 twenty, as California Gulls, while in 1934 no individuals of this species were seen. The possibility of mistakes in identification is admitted. It is often difficult to distinguish between adults of the two species particularly so, perhaps, when the birds are in flight which is the aspect most commonly viewed by the observer on a nesting colony, unless detailed study is being conducted from a blind. The relative size of the two gulls is an unsatisfactory means of identification because there is little difference in this respect between the male Ring-billed Gull and the female California Gull, and in any case one frequently is deceived by the apparent size of a gull as anyone who has collected them will testify. The best diagnostic character separating the two species in life appears to be the dark band on the bill of the Ring-billed Gull and upon this feature I placed chief reliance as a means of identification.

Downy young of the two species can be separated by the whiter head of *californicus*, and juvenals can be distinguished readily for the reason that *californicus* in this stage is much the darker of the two. I found no downy young, and only one juvenile California Gull on Goose Island.

Examination of several hundred clutches of eggs revealed none which, by greater size, could be ascribed to the California Gull. One nest upon which lay a dead female California Gull was assumed to be of this species and in this case the eggs did not appear to be any

larger or to have any markings which would serve to distinguish them from those of the Ring-billed Gull.

Incidental to this it might be mentioned that during fourteen years' field work (1921 to 1935) in Alberta and Saskatchewan I found the California Gull to be less common than would be anticipated from reading the literature, most of it published prior to that time. One is obliged to conclude either that this species is becoming less common or else that some of the earlier Canadian prairie records are based on mistaken identification.

However that may be it is certain that during the years 1932 to 1934 Goose Island was colonized chiefly by the Ring-billed Gull, and therefore it may be assumed that at least 95 per cent of the food material discussed later in this paper was taken by this species.

My visits to the colony were on the following dates: June 19, 1932; May 26, 27, 1933; June 2, 1934.

Description of locality. Bittern Lake, comprising at high water mark some seventeen square miles of shallow water, is contained chiefly in Township 47, Range 21, and Township 47, Range 22, west of the Fourth Meridian. It is surrounded by rolling, broken prairie largely under cultivation but retaining remnants of the original trembling aspen, and balm-of-gilead growth on the less arable portions. The shores are low, bare, and for the most part composed of heavy clay. In some places are intrusions of hard sand, some of which are mixed with boulders. The water is strongly alkaline and supports little hydrophytic vegetation or aquatic animal life.

Goose Island in earlier times of high water was the most easterly situated of two low-lying islands close to the north end and nearest to the west shore of the lake. With a progressive shrinkage of the water area during the past decade the island nearest the shore increased in size with the accretion of exposed lake bottom and finally joined the mainland to form a wide peninsula from the end of which Goose Island was separated by a shallow channel. By 1932 the intervening water was reduced to a width of forty feet and in the summer of 1933 and 1934 the channel was dry, the two islands thus forming a continuous extension of the mainland.

Goose Island proper is circular in shape with a well-defined point at the east side. It comprises several acres of relatively fertile land, rich in plant life, at an elevation of five feet or so above the surrounding barren expanse of exposed lake bottom which supports no vegetation other than the alkaline-loving skunk grass. The vegetation on the island consists of low willows, a luxuriant growth of vetch repre-

sented by several species, various grasses, silver weed (*Potentilla anserina*) on the more open sandy places, lambs' quarters, dandelions, and other imported weeds.

Mr. Farley has told me of paddling to the island from the east shore of the lake at a time when the willow bluffs, only a few yards from the water's edge, outlined the edge of a narrow shelving beach when the lake water was clean enough for human use and the island vegetation not infected by introduced weeds. Such times would seem definitely to be in the past, and the present surroundings of exposed lake bottom in its drab barrenness are in striking contrast to what formerly existed.

Behavior. As we left the mainland shore and crossed the exposed lake bottom white masses of gulls could be seen in the distance above the short vegetation on the island. While we still were distant some three hundred yards from this objective some of the gulls flew toward us at no great height, and after wheeling over-head several times followed or preceded us toward the island. When we reached the nesting grounds the gulls circled above us quite low, constantly planing earthward in short, savage swoops, so that a rush of air from their cleaving wings could be felt on the cheek.

This was on June 19, 1932, when some of the young were well advanced. In the two following years, when the island was visited earlier in the season and most of the nests contained eggs, the gulls showed less concern at our arrival and I was able to approach close enough to obtain photographs of the sitting birds. At these times the majority of the birds did not rise until we were within fifty yards or so and after a few demonstrative attacks they settled on the water close to the shore.

Nests. Each year the colony consisted of three separate, well-defined nesting areas. The largest one, near the west side of the island, was restricted to a strip of beach roughly one hundred and fifty yards by fifty yards. This was uneven ground including a boulder-strewn terrain, defining a former high water mark but now twenty yards distant from the lake edge, and the outer portion of a grass belt which extended inland to the edge of the willow bluffs. This contained 376 nests in 1934. Two hundred yards east was a second group of forty nests similarly situated and on the point at the east side of the island was the third nesting ground containing 300 nests. These were much closer together than was the case elsewhere. Some almost touched and it was not unusual to find four or five nests within a space of four square yards or less. This crowded section of

more or less circular shape, with its trampled vegetation, the smooth, worn appearance of numerous hummocks, the accumulation of feathers and the white splashings of excrement, was conspicuous indeed amongst the surrounding growth of grasses and vetches.

The chief nesting material was a fine, wiry grass of local origin and other plant material was used less extensively. In some cases filamentous algae to which clay had adhered were an important constitutent and nests thus reinforced were substantial structures eight to ten inches high. But the majority were less than half this height and some were simple rings of dry vegetation surrounding the eggs. One grass nest some distance away from the others on what formerly was lake bottom had been built beside the skull of a large bison bull, which was used as a perch. This was one of several bison skulls which, preserved under water for many years and during that interval stained a rich, rusty orange through some chemical action, had recently been uncovered by the receding waters.

Eggs. The majority of nests contained three eggs, which seems to be the maximum laid by one bird. Clutches of four or five were not uncommon but in such cases a difference in coloration of one or two eggs indicated that a second female was involved. One nest containing seven eggs was noted. The great variety of ground color and blotching was astonishing, indeed there was speculation as to whether two clutches of identical appearance could be found. Some of the combinations of light ground color and dark, massed blotching were handsome enough to stir dormant oölogical emotions in the hearts of the investigators.

It is of interest to record that a freshly laid Robin's egg was found in a gull's nest! No Robins nest on the island.

On May 26, 1933, most of the nests contained a full complement of eggs and none had hatched. On June 19, 1932, nests with eggs were still in evidence.

Young. On June 2, 1934, about 50 per cent of the nests, approximately 350, contained recently hatched young, the earliest about one week old. Two distinct color phases, gray and fawn, are apparent, the former being much the more common. In a few cases one fawn-colored and two gray downy young were together in a nest but it was usual to find the two color phases separated.

Well developed young were the rule on June 19, 1932. When disturbed by our walking through the nesting ground these youngsters sought shelter amongst the thick vegetation farther inland. Large birds after running quickly to some place of partial concealment

FIG. 33. Nesting colony of Ring-billed Gulls, at Bittern Lake, Alberta (above). Nest of a Ring-billed Gull at the side of a bison skull (middle). Young Ring-billed Gulls (below). Photographs by J. A. Munro, and loaned by courtesy of the National Parks of Canada.

would crouch in the grass or against an earth hummock or boulder until the observer attempted to piek them up, whereupon they again would scuttle off. Younger birds on the other hand after the initial run would lie prostrate and could be handled at will.

Casualties. As in all gull colonies, dead adults showing no external marks of injury frequently were diseovered. On June 19, 1934, the bodies of nine adult Ring-billed Gulls and one California Gull in the plumage of the third year were counted on the open parts of the island. No casualties amongst the young were noted on June 2, 1934, at a time when most of the young were newly hatched, but on June 19, 1932, when the average age of the young was perhaps two weeks, a eonsiderable mortality was observed. The careasses of 200 birds of various ages were seattered about on the open ground and it seems likely that other dead young were concealed in the thiek vegetation.

Enemies. With the drying up of the last winter barrier between mainland and island it was thought probable that the gulls would desert the colony beeause of possible depredations by mammal predators. This proved unfounded and the population did not even decrease. Seareh was made for traeks of coyote or skunk approaching from the mainland but no evidenee of this was found. A few erows nest in the willows on the island but no evidenee of their having destroyed gulls' eggs or young was obtained. In 1934 a herd of sheep was turned out on the island in eare of a resident shepherd. It is not known how the gulls fared under this visitation.

Food. The barren shores and alkaline waters of Bittern Lake provide little food for gulls. The only evidence of animal life found on the muddy beaehes eomprised the shells of two species of mollusca, neither of whieh was common. These have been identified by the United States National Museum as *Succinea grosvenori* Lea and *Stagnicola palustris elodes* Say. Other data eoneerning the animal life in the lake are not available.

Just how far these gulls travel in seareh of food is not known. They are seen through the summer hunting over eultivated fields and prairies in the district adjaeent to the lake and they visit the eity dump at Camrose, fifteen miles or so distant. But no doubt daily trips are made for distanees much greater than this.

An important food is Richardson's ground squirrel (*Citellus richardsoni*). Large numbers of skulls and other remains of this animal were found on the island where they had been carried by the gulls. Perhaps the majority of these represented carrion for it is difficult

to conceive of a Ring-billed Gull capturing so large an animal. Hundreds of ground squirrels are killed on the roads by motor cars and it is a common sight to see gulls, crows, and occasionally other birds tearing at the carcasses. No doubt such casualties explain the chief source of this food supply. Sometimes Ring-billed Gulls attempt to swallow a ground squirrel too large for their capacity of ingestion, with fatal results. I found no less than five dead gulls, each with the hind end of a ground squirrel protruding from the mouth.

Other food data were obtained through the examination of thirty-seven regurgitated pellets recorded as follows.

May 26, 1933

1. Husks and broken kernels of wheat, 98 per cent; a few beetle fragments, 2 per cent.

2. Pieces of straw, 40 per cent; cowhair, 45 per cent; beetle fragments, 5 per cent.

3. Hard parts of small ground beetles, *Carabidae*, representing at least twenty-five individuals, 90 per cent; pieces of straw and wheat kernels, 10 per cent; several pieces of gravel.

4. A quantity of wheat husks and one whole kernel, 98 per cent; fragments of a ground beetle, 2 per cent; several pieces of gravel.

June 2, 1934

Contents of thirty-three pellets from nesting colony at Bittern Lake, Alberta, collected June 2, 1934.

5. Fragment of bird's trachea, 10 per cent; elytra and other fragments of Carabid beetle; one beetle larva, 25 per cent; vegetable matter including dry grass, thistle seeds, and rootlets, 65 per cent.

6. Wheat, 99 per cent; elytra carabid beetle, 1 per cent.

7. Wheat, 95 per cent: other vegetable matter, 5 per cent.

8. Wheat, 98 per cent; grass fragments and vegetable debris, 2 per cent.

9. Rami and parts of upper mandible of a gallinaceous bird, possible Gray Partridge (*Perdix perdix*), 10 per cent; hair and bone fragments of ground squirrel (*Citellus richardsoni*), 10 per cent; parts of wild oats, 5 per cent; wheat, 30 per cent; vegetable debris, 44 per cent; insect fragments (chitin), 1 per cent.

10. Pupal cases of Diptera, 95 per cent; vegetable debris, 5 per cent.

11. Oats, 30 per cent; wild oats, 5 per cent; vegetable debris including coarse sawdust, 59 per cent; cowhair, 1 per cent.

12. Oat husks, 30 per cent; coarse sawdust, 68 per cent: fragments Diptera pupal cases, 1 per cent; cowhair, 1 per cent.

13. Oats, 28 per cent; wild oat husks, 2 per cent; coarse sawdust, 65 per cent; fragments of elytra and tarsus of at least two Carabid beetles, 2 per cent.

14. Wheat, 99 per cent; piece of a mollusc shell, 1 per cent.

15. Wheat, 60 per cent; oats, 10 per cent; vegetable debris, 30 per cent.

16. Wheat, 100 per cent.

17. Shell fragments of duck's eggs and egg lining, 15 per cent; pupal cases of Diptera, 10 per cent; vegetable debris including rootlets, 75 per cent.

18. Pupal cases of Diptera (app. 100), 90 per cent; vegetable debris, 8 per cent; cowhair, 2 per cent.

19. Wheat, 55 per cent; oats, 5 per cent; vegetable debris, 35 per cent; cowhair, 5 per cent.

20. Two lower mandibles, leg bones, and hair of vole, 100 per cent.

21. Wheat, 50 per cent; elytra and other Carabid beetles, 40 per cent; vegetable debris including *Carex* seed, 10 per cent.

22. Wheat, 100 per cent.

23. Wheat, 95 per cent; two small mammalian bones, possibly *Citellus*, 4 per cent; mollusc shell fragment, 1 per cent.

24. Wheat 100 per cent.

25. Hair and bones of one adult, three juvenile voles, 100 per cent.

26. Pupal cases of Diptera, 25 per cent; cowhair, 75 per cent.

27. Wheat, 48 per cent; oats, 2 per cent; coarse sawdust, 46 per cent; cowhair, 3 per cent; insect fragments, 1 per cent.

28. Wheat, 55 per cent; oats, 4 per cent; wild oat fragments, 1 per cent; coarse sawdust and vegetable debris, 37 per cent; cowhair, 2 per cent; insect fragments, 1 per cent.

29. Wheat, 98 per cent; vegetable debris including two *Carex* seeds, 2 per cent.

30. Wheat, 100 per cent.

31. Pupal cases of Diptera (app. 150), 98 per cent; cowhair, 2 per cent.

32. Wheat, 96 per cent; oats, 3 per cent; insect fragments, 1 per cent.

33. Bones and hair of at least two voles, 100 per cent.

34. Bones and hair of at least two voles, 100 per cent.

35. Wheat, 70 per cent; oats, 10 per cent; vegetable debris, 19 per cent; fragments of pupal cases of Diptera, 1 per cent.

36. Wheat, 45 per cent; cowhair, 45 per cent; fragmentary pupal cases of Diptera, 5 per cent; vegetable debris, 5 per cent.

37. Hair and bones of one ground squirrel, *Citellus richardsoni*, 100 per cent.

List of Items	Percentage Frequency	Percentage Occurrence	Average Percentage Volume
Wheat	21.8	57.6	78.6
Oats	10.3	27.3	14.1
Wild Oats	4.6	12.1	3.2
Ground Squirrels	3.4	9.1	38.0
Voles	4.6	12.1	100.0
Birds	2.3	6.1	10.0
Duck eggs	1.1	3.0	15.0
Miscellaneous insects	5.7	15.2	5.8
Carabidae	3.4	9.1	14.7
Diptera (pupae)	9.2	24.2	40.6
Mullusca	2.3	6.1	1.0
Vegetable debris	19.5	51.5	33.0
Cowhair	11.5	30.3	15.5

Vegetable debris comprised coarse sawdust, dead grass, and unidentified material.

Gull feathers (down) were found in four pellets.

Percentage frequency: The percentage of representation in a total of eighty-seven occurrences.

Percentage occurrence: Percentage of pellets in which the item occurred.

Average percentage volume: Volume for particular items.

Some of these pellets were fresh when collected, that is to say they had been regurgitated within an hour or so, others had been cast a day or several days earlier. Probably none were more than a week old because care was taken to select only the freshest appearing pellets. For example, most of those whose chief constituent was wheat were soft and wet when found. Subsequently these specimens dried out and became so hard it was difficult to break them.

The association of the pupal cases of Diptera with cowhair probably indicates a carrion origin for this insect food. The frequent occurrence of Carabid beetles with wheat suggests that the gulls had been feeding over stubble, or perhaps newly planted fields, where grain and beetles were picked up indiscriminately.

Wheat and oats were represented mainly by the outer layers of the kernels, the more soluble parts having been digested. These grains, more particularly wheat which was found in 57 per cent of the pellets and represented an average volume of 78 per cent, would appear to be an important food in spring and early summer. The probable sources are about grain elevators, along the railroad tracks and on summer fallow, all being localities which the gulls cover in their search for food.

FIG. 34. A Ring-billed Gull choked to death in attempting to swallow a Richardson's Ground Squirrel (left). Nest and seven eggs of the Ring-billed Gull (middle). Avocet's nest with five eggs and two downy young (right). Photographs by J. A. Munro, and loaned by courtesy of the National Parks of Canada.

Food of Downy Young. Two of five downy young collected for stomach analyses on June 2, 1934, contained food. These birds were thought to be approximately two days old.

No. 1. Insect fragments and eggs of a Dipterous insect, 60 per cent; vegetable debris including two *Carex* seeds, 40 per cent.

No. 2. Two damsel fly nymphs, eight Caddis adults, one Midge larva, 95 per cent; vegetable debris including one *Carex* seed, 5 per cent.

Relation with other bird species. Canada Goose, Mallard, Gadwall, Avocet, and Marbled Godwit were found nesting either on the island or close to it on the peninsula, the most numerous being the Avocet and the Canada Goose. These species were present in substantially the same numbers each year.

On June 19, 1932, on our way to the island we visited a colony of Avocets and found five nests with eggs and another in which two of eight eggs had hatched. The downy young were still in the nest. The nests were situated amongst sparse sedges at the outer edge of vegetation on the peninsula. Some were in the open and none were well concealed. The Avocets, associated in a flock, circled about us or flew up and down the beach. Several times they alighted on the shallow water and with head and neck bent downward paced along swinging their bills through the water with that curious side-wise motion characteristic of the species. On June 2, 1934, the colony numbered thirty-four birds which was approximately the same as it had been two years earlier. No evidence of molestation by gulls was observed.

A nest of Marbled Godwit with four eggs and a nest of Gadwall with six eggs both close to the nesting gulls had not been disturbed by them. Usually they nest amongst the willows or the thick vetches on the island proper.

The goose population comprises five or six pairs of breeding birds and about the same number of non-breeders. On May 26, 1933, after examining a nest containing egg shells which had been built in an opening amongst low willows, I discovered a second nest near the east shore. This one was a high substantial structure in the midst of the gull colony, some of the gulls' nests being within four or five feet. As I approached, the goose was seen standing with outstretched neck beside her nest partly concealed by some low vegetation. As I drew nearer she walked toward the water, a few rods distant, followed by three downy goslings just recently hatched. They launched out on

the water and proceeded toward a gander which was swimming back and forth a hundred yards or so from shore.

At this point I pictured in imagination an earlier scene: the goose on her high nest mound, in plain sight from every direction, settled on the eggs with a fluff of down showing along her flanks. Passing overhead and walking about close to her nest, dozens of gulls were her constant, noisy, and active associates. They built their nests within a few feet of the quiet goose. When she left her nest each day for food and water her five eggs were within easy reach of the gulls—a few quick stabs of the bill and all would have been destroyed—and they had survived intact.

But I noticed a fourth gosling, apparently a weak one, walking with uncertain steps far behind the others. It was transferred to the water and kept under observation while it swam toward the rest of the brood that, led by the goose, had reached a position close to the gander. When this fourth gosling was distant about forty yards from the shore a Ring-billed Gull picked it up and then, perhaps alarmed by my shouts, dropped it again. Later on when this downy was retrieved it was seen that its back had been broken. Meanwhile several other gulls had picked up and swallowed the three remaining goslings, while the two geese swam passively about making no attempt to defend their young. As this happened at a distance of at least 100 yards from where I stood it is considered that my presence on the scene probably was not responsible for the apathy of the parent geese.

Summary

A nesting colony of Ring-billed Gulls together with a few California Gulls situated on an island in Bittern Lake, Alberta, maintained a population of approximately 800 pairs during the nesting seasons of 1932, 1933, and 1934. A study of food remains on the island indicated a diet, for the months of May and June, of grain, ground squirrels, carrion, ground beetles, and mice, named in the order of their importance. Evidence of ducks' eggs being eaten was detected in one instance. Eggs, most of them unconcealed, in an adjacent colony of Avocets were not destroyed by gulls. A brood of four newly-hatched Canada Geese were eaten.

The data obtained are insufficient for definite conclusions regarding the local food habits of the species but are of sufficient interest to suggest that a detailed study is desirable.

Okanagan Landing, B. C.